



Te Whatu Ora
Health New Zealand

Small for Gestational Age and Fetal Growth Restriction in Aotearoa New Zealand

He Aratohu Ritenga Haumanu mō te Tōhuatanga Kōpiri me te Pakupaku Rawa

**Transcript of the webinar
for health practitioners**

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Introduction

This document is a verbatim transcript of the webinar for health practitioners on the *Small for gestational age and fetal growth restriction in Aotearoa New Zealand He Aratohu Ritenga Haumanu mō te Tōhutatanga Kōpiri me te Pakupaku Rawa*.

This webinar is presented by Anna Francis, Dr Chris McKinlay, Claire MacDonald and Dr Ngaire Anderson.

Transcript

00:00:12:13 - 00:00:31.22

Ngaire Anderson

Nau mai haere mai and welcome to this webinar series on the new guidelines: *Small Gestational Age and Fetal Growth Restriction in Aotearoa New Zealand*. My name is Ngaire Anderson. I'm an obstetrician gynecologist at Waitemata and I chaired the development of this guideline. I'd like to introduce you to the people with me today.

Claire.

00:00:32:02 - 00:00:45:00

Claire MacDonald

Tena koutou. I'm Claire MacDonald. I'm a Midwifery Advisor at Te Kāreti o ngā Kaiwhakawhānau ki Aotearoa the New Zealand College of Midwives and I was one of three midwives on the guideline development panel.

00:00:45:18 - 00:01:00:00

Anna Francis

I'm Anna Francis. I'm the family representative. I'm a mother of an eighteen-year old son who was growth restricted so I've been privileged to be a part of this development from the onset and have had a little bit of input. So thanks for having me.

00:01:00:20 - 00:01:14:22

Chris McKinlay

Thank you for taking the time to review these webinars. My name is Chris McKinlay. I'm a neonatal paediatrician at Counties Manukau and also researcher in neonatal child health at the University of Auckland and I was nominated by the Newborn Clinical Network to work on this guideline.

00:01:15:18 - 00:01:50:08

Ngaire Anderson

So, this webinar is in five sections:

- The first, this video, is the introduction to the guideline.
- There is a guide video on screening and the detection of fetal growth restriction.
- There is a video on antenatal management of fetal growth restriction and birth.
- There is a video on the care of the newborn and postnatal management and finally, a video on the development process.

So, the new SGA/FGR guideline is a document that comes in two parts. The first part is an evidence document, and that goes into the details of all of the evidence that we've reviewed in order to come up with the recommendations. It's quite a long document, so I'd like to point you towards the summary document, which includes all of the recommendations that we've made, including the grades of recommendation. It also includes all the tables and flowcharts that you need in order to use these guidelines clinically.

So this guideline supersedes the 2014 New Zealand MFM guideline as this guideline was developed with a multidisciplinary base using evidence-based processes.

There are some differences from the 2014 guideline and there is a table of differences in the front of the document. I'd just like to outline some of those differences now. The main difference is that we've changed the gestation of early-onset fetal growth restriction from 34 weeks to 32 weeks, and that is consistent with international best practice.

The next change is that the abdominal circumference that is defined as identifying a baby at risk of small for gestational age has changed from less than the fifth centile to less than the 10th centile. And that is based on evidence that suggests that an estimated fetal weight or an abdominal circumference less than the 10th centile both equally predict the birth of a small for gestational age baby.

We have been a little bit more clear about the dropping in centiles of estimated fetal weight or AC to define slowing of fetal growth. That's a 30 centile drop but we've focused that on the third trimester (so from 28 weeks onwards).

With regards to risk factors, this will be covered in a little bit more detail in the screening video; however, we have removed the PAPP-A from our list of major risk factors as this is not being reported by the National Screening Unit anymore. You'll see that maternal age over 40 years of age is only a major risk factor if you're nulliparous. Those who are multiparous: we've included them as a minor risk factor for growth restriction. And on that note, we have a table of minor risk factors, of which if you have three or more, then you

may be at increased risk of fetal growth restriction so additional screening using ultrasound could be considered.

There is a schedule of recommended screening ultrasounds for those with risk factors, and that includes a new screening programme for those with three or more minor risk factors.

And we've also focused on the use of the CPR or cerebroplacental ratio rather than the MCA Doppler in order to identify fetal growth restriction. That will be outlined more in the diagnosis video. Finally, we are the first international guideline to define what fetal growth restriction looks like in the newborn, which I think is a major step forward.

00:04:51:08 - 00:07:17:11

Claire MacDonald

As a multidisciplinary team working together on a complex and detailed guideline, it was important for us to ground our thinking right at the beginning of the process. So we agreed on five principles that underpinned how we considered the evidence and how we put our recommendations into the document. So I'll quote from the guideline:

The five principles are that:

- The pregnant woman or person and their whānau are at the centre of all care decisions and they share the decision-making with health practitioners within Aotearoa New Zealand's model of midwifery-led continuity of care.
- The optimal outcome is the birth of a healthy, well-grown baby at term and a well woman or person following a spontaneous onset of labour.
- Where a pregnancy is identified as FGR or SGA, additional monitoring and judicious use of intervention is planned with informed decision-making between the pregnant woman or person and the care provider with the aim of optimising outcomes for the pregnant woman or person and baby.
- Where possible, expectant management should be planned, supporting the safe prolonging of pregnancy and physiological birth.
- Potential resource limitations and access to care and equity are considered at each step, but these considerations don't change the best practice recommendations according to the evidence.

During the guideline development process, the panel was acutely aware of the resource limitations within our current maternity context, and we were concerned that we wanted to ensure there was equitable access to the things that women and people need for screening and monitoring of potential or actual SGA and FGR pregnancies. So we've raised the issue of access to ultrasound scans with Te Whatu Ora, and they have provided us with a statement which I'll share with you now: *Te Whatu Ora acknowledges that there*

are barriers to accessing ultrasound scanning and anticipates that fully embedding this guideline may take some time. We are actively working towards solutions to improve access. It is expected that practitioners utilise this guideline to the best of their ability, ensuring clear documentation and rationale when there is an inability to do so.

00:07:18:21 - 00:11:34:08

Chris McKinlay

Our thinking in this guideline has been underpinned by some important physiological principles relating to fetal growth. The first is that, in practical terms, the fetus has an unlimited capacity to grow in size and so, even healthy pregnancies have their growth fetus growth will be limited by the ability of the placenta and the uterus to supply nutrients and oxygen. This means that, under normal circumstances, fetal growth is actually constrained and there are several key factors that contribute to constraint. The first is the mother's size. The second is her parity and then there are also small differences in constraint relating to ethnicity. The consequence of this is that there is no universal standpoint by which to assess fetus size across all pregnancies. And so it's important that we customise our measurements of fetal size or birth weight and this allows us to make a fair comparison across different women and different pregnancies.

So what is fetal growth restriction? Fetal growth restriction is when there is an abnormal reduction in fetal growth due to either pathology in the uterus or the placenta or disease conditions in the mother or baby. It's important that we identify fetal growth restriction either antenatally or in the baby after birth because there are many health consequences for an infant or child that has experienced growth restriction. There is an increased risk of perinatal mortality, both stillbirth and death in the neonatal period. Babies who have growth restriction are at risk of extreme preterm birth, which has its own complications, and babies who have growth restriction have much higher rates of transitional problems after birth including low blood glucose concentrations, low temperature, difficulty feeding. And then later in life, there are adverse health effects of being severely growth restricted in childhood. These include having high blood pressure, cerebral palsy, other learning difficulties and short stature and these may contribute to long term health problems as adults, particularly vascular disease and metabolic syndrome.

Another important aspect of this guideline is that we've tried to clearly delineate between small for gestational age (or SGA) and fetal growth restriction (FGR). This is important because not all small babies have growth restriction and some will just have more than average constraint and are actually healthy. Fetal growth restriction typically presents with low weight or SGA, but not in all situations. So it is possible to have fetal growth restriction in the normal birth weight range.

You can see in the graph on the x axis shows the customised birth weight and on the vertical axis shows the proportion of babies who are growth restricted. As the customised birth weight centile decreases, we are more likely to see babies with true fetal growth restriction. And at the very extreme end, under the third centile, these babies are growth restricted by definition.

This graph shows another example of looking at the difference between SGA and FGR. On the horizontal axis shows the gestation and on the vertical axis, the customised birth weight with the 10th and the 90th lines in dark. Lines A and B show examples of potential fetal growth restriction, but still within the normal birth weight range. So these babies have abnormal growth but are not SGA. The line C shows a baby that could have fetal growth restriction or could also be small for gestational age without growth restriction if the pregnancy was otherwise perfectly normal and healthy.

00:11:35:04 - 00:13:09:23

Anna Francis

So I wanted to share a little bit about my son, Alex, who was growth restricted. He's 18 now with a diagnosis of cerebral palsy, visual impairment, severe intellectual impairment and his level, he is considered GMSC level five, which is well he's the most extreme of disability. But with growth restriction, obviously it varies. But Alex is unable to talk, unable to walk, unable to eat, unable to communicate really. He can smile: he has a fabulous smile. So this affects every aspect of daily life for him and for all of us who care for him. So this guideline is really important and it's been a huge privilege to be a part of it and see just the extreme amount of work that's gone into it. I want to take a minute to just acknowledge that the work that you do in delivering these babies, assessing these babies, monitoring these babies. For every safe delivery, take a minute and just have gratitude for the work that you're doing and the lives that you're saving, because when it goes well, it is truly a miracle in all the good ways. So from a parent where it's going wrong (I have other children where it went right), I want to sincerely thank you for all of your work in taking care of all of our babies.

In this section, you'll be hearing from Ngaire Anderson and Claire MacDonald around reducing risk, screening and diagnosis of growth restriction.

00:13:19:08 – 00:17:02:08

Claire MacDonald

Within pregnancy care, taking a health history is an integral part of what a midwife or any health professional does, and part of a health history, particularly at a registration visit and then ongoing throughout the pregnancy, is to consider any factors that might increase the likelihood of complexity developing, including small for gestational age and fetal growth

restriction. Now we know this is not a perfect science, but we've done our very best within this guideline to collate the factors that contribute to an increased likelihood of developing fetal growth restriction and then to make some recommendations on what the screening is that we would recommend with some of those risk factors and also what the monitoring should look like once SGA or FGR has been diagnosed. I think it's also important right at the outset to acknowledge that even with the absolute best screening and monitoring, we will probably pick up around about six out of every ten babies who actually have small for gestational age or fetal growth restriction. But by putting these guidelines into practice, that is a lot more than what we were picking up prior.

Throughout the guideline development process, we've tried to present the information in a really accessible and useful way to health professionals and what we've done is put the major risk factors into a table, the minor risk factors into another table. And we've integrated those tables into an algorithm on recommended screening during pregnancy, which follows onto monitoring if small for gestational age or fetal growth restriction is diagnosed.

Major risk factors for small for gestational age or fetal growth restriction include:

- maternal age, 40 years or more if the woman or person is having their first baby
- continued smoking at 16 weeks or more of pregnancy
- recreational drug use
- chronic hypertension
- diabetes with vascular disease
- renal impairment
- antiphospholipid syndrome
- previous SGA or FGR pregnancy
- previous hypertensive disorder of pregnancy
- previous stillbirth
- heavy bleeding before 20 weeks of pregnancy
- pre-eclampsia or gestational hypertension and
- antepartum haemorrhage or placental abruption.

In this guideline, we took a new approach of adding in minor risk factors as well, because these on their own are not factors that would generally increase the risk very much of having a baby with growth restriction. However, when you start to add them up, there may be an increased chance of that occurrence. And so if there are three or more of the factors in the minor risk factor table, we would suggest some additional monitoring which we'll come to shortly.

The minor risk factors are:

- nulliparity (so having a first baby)
- maternal age of 40 or more if the woman or person has had babies before
- smoking 1 to 10 cigarettes per day
- a short or long interpregnancy interval (so less than a year or more than five years)
- conception via assisted reproductive technology
- body mass index of 30 or more or 18.5 or less and
- in the current pregnancy, a placenta previa or low gestational weight gain (and we're defining that as not being on track to get to the minimum recommended gestational weight gain for that woman or person's pregnancy, according to the agreed national definition).

00:17:03:19 – 00:18:54:08

Ngaire Anderson

So concerns about fetal growth are going to affect approximately 12 to 14% of all pregnancies. The vast majority of these occur at term. So this is predominantly a disease of late pregnancy. However, there are a few things that we can do pre-pregnancy and in early pregnancy in order to reduce the chance. The first is that pre-conception folic acid has been shown to reduce the chance of having a small for gestational age baby. So we know the benefits of folic acid for reducing neural tube defects. There also appears to be a 20% chance of reducing SGA and FGR if folic acid is taken pre-conceptually. Unfortunately, taking folic acid after you're pregnant does not reduce your risk of fetal growth restriction. So all women who are considering a pregnancy should be recommended to take folic acid.

The next point is around smoking in pregnancy. So we know that cigarette smoking is a risk factor for fetal growth restriction. However, the good news is that women who are able to smoke to stop smoking in the first trimester of pregnancy before 15 weeks have a risk of fetal growth restriction that's no different from a non-smoker. This is excellent advice and provides a target for women to stop smoking in the first trimester.

Finally, those with major risk factors for fetal growth restriction that are also risk factors for pre-eclampsia can benefit from low dose aspirin. In the table, look out for the icon that indicates that aspirin is recommended. These women should be taking 100 milligrams of aspirin at night, starting from between 12 to 16 weeks gestation and continuing to 36 weeks. These women have a reduced risk of fetal growth restriction when aspirin is taken, and also because of the shared risk factor with pre-eclampsia, these women will also often benefit from calcium supplementation.

Claire MacDonald

When considering recommendations for screening for fetal growth restriction, the guideline panel considered the evidence and also considered what is the optimal screening for women and people who are low risk of fetal growth restriction and also how we make the best use of our ultrasound resources for those who have minor risk factors or major risk factors or for whom height measurements are not particularly accurate.

Following a health assessment at the start of pregnancy, if it's determined that the woman or person doesn't have any major risk factors or has only two or fewer minor risk factors, then the recommended primary screening is fundal height measurements, starting at the start of the third trimester and no more frequently than every fortnight. That's the first part of it. The second part is ensuring that you plot those fundal height measurements on a customised growth chart.

Ultrasound scanning is the recommended mode of screening for fetal growth restriction for women and people who have certain risk factors or characteristics during the pregnancy. And we've divided those into three groups and produced those into a table to assist in decision making. The first of these groups is when someone has three or more minor risk factors or fundal height measurements are not particularly reliable. So that could be someone with a raised body mass index or someone with large uterine fibroids, for example. In that circumstance, we would suggest two growth scans, and that might be at about 30 to 32 weeks gestation, and then again, 36 to 38 weeks pregnant.

The second group is when someone has a major risk factor for small for gestational age or fetal growth restriction. And for those women and people, we would recommend monthly growth scans starting from between 28 and 30 weeks of pregnancy and continuing until birth. For those who have one or more risk factors for early-onset FGR and that's indicated in the risk factor table with an icon, the guideline recommends monthly growth scans starting from between 24 and 26 weeks' gestation and continuing until birth. And also, consider a uterine artery Doppler study between 20 and 24 weeks' gestation.

And then there's the group of low-risk women and people who are having fundal height measurements plotted on a customised growth chart. If the fundal height indicates a slowing of growth over consecutive measurements (and this is from 28 weeks onwards), we would recommend an ultrasound scan to assess whether or not growth restriction is occurring. So there is a decrease of at least 30 centiles. And the other indication from a for an ultrasound from a customised growth chart is if any measurement falls below the 10th centile.

Ngaire Anderson

Fetal growth restriction is diagnosed if the estimated fetal weight or the abdominal circumference is less than the third centile regardless of gestation, as these are our smallest and most vulnerable babies. If the estimated fetal weight is less than the 10th centile, but above the third centile, we need to look for additional evidence to see whether the baby is growth restricted or not.

Less than 32 weeks, that is our early-onset FGR, if there is an abnormal uterine artery Doppler or umbilical artery Doppler, then that fulfills the criteria for fetal growth restriction. In our late-onset babies (over 32 weeks), you need two of the following three criteria:

- An estimated fetal weight between the third and the 10th centile
- A slowing of growth (and that is more than 30 centiles of the abdominal circumference or estimated fetal weight in the third trimester) or
- an abnormal Doppler.

Two of two out of the three of those criteria fulfills our diagnosis of fetal growth restriction, and this allows us to diagnose fetal growth restriction in those babies that are not small for gestational age.

So we use customised centiles to define normal growth as this accounts for physiological differences between mothers that then determine the size of what we would consider the optimal weight of their baby. For example, a taller woman is more likely to give birth to a larger baby than a smaller woman. Population centiles don't account for this variation. Customised centiles have been shown to improve detection of small babies that are at risk of adverse outcomes.

When an estimated fetal weight is reported, sometimes a Hadlock population centile is also reported. This should not be acted on. In fact, the estimated fetal weight should always be plotted on a customised chart, ideally, at the time of scanning, but if not as soon as possible afterwards. If it's less than the 10th centile or crossing centiles, that's when Doppler studies should be performed.

So I wanted to talk a little bit more about Dopplers. So the main Doppler that we're looking at is the umbilical artery Doppler, which reflects the flow through the placenta. The placenta is a low resistance circulation. It should be really easy for the fetus to push blood through the placenta to get the oxygen and nutrients back. As the placenta vasculature deteriorates, you get a resistance to flow in the umbilical artery. Abnormal umbilical artery Dopplers are actually very uncommon in late-onset fetal growth restriction, but more common in early-onset. So in our late-onset babies, of which there are much more of them, we want to look for other measures of fetal wellbeing. So one of those measures is the middle cerebral artery Doppler. So this is a way of us assessing whether the fetus is

prioritising blood to its brain in compensation for what it may not be getting from the placenta. However, a more sensitive measure of what's going on with the late-onset growth restricted baby is a ratio of the middle cerebral artery to the umbilical artery Doppler called the cerebroplacental ratio or CPR. Now, in this guideline, we have prioritised the CPR over the MCA Doppler result as there is evidence that the CPR is better predictive of fetal outcomes than the MCA. So, what we're asking radiologists to do is to perform the MCA Doppler study, but only report CPR.

A final note on uterine artery Doppler assessments: so uterine artery assesses the placental function from the maternal side. When it's used as a screening test from 20 to 24 weeks gestation, we're using that as a way of predicting whether fetal growth restriction or pre-eclampsia is likely to occur particularly at an early-onset gestation. When used at the time of diagnosis of fetal growth restriction, an abnormal uterine artery Doppler indicates utero placental insufficiency. Now, unlike other Doppler measurements like the CPR, uterine artery Doppler doesn't change over time. So a single measurement at the time of growth restriction diagnosis is all that's required, and this Doppler doesn't need to be repeated.

00:26:18:08 – 00:27:17:10

Claire MacDonald

This section has been about screening for fetal growth restriction, and we'll get on to the monitoring if fetal growth restriction has been diagnosed in the next section. But we did just want to make one final note about the frequency of ultrasound scans. So where there's no indication yet of fetal growth restriction, we would recommend the ultrasound scanning as per the table that we described earlier.

However, if there is a suspicion that fetal growth restriction might be starting (for example, the baby's weight is below the 10th centile or there's been a decrease across more than 30 centiles in estimated fetal weight but Dopplers have been normal) then we would suggest re-screening for growth at three weeks after that ultrasound scan and certainly no more frequently than two weeks. So that three-week marker is recommended in order to minimise false positives and of course, in some circumstances, the clinician may deem that it's most appropriate to be at two weeks.

00:27:19:31 – 00:27:26:04

Anna Francis

In this section about antenatal management with fetal growth restriction, you'll be hearing from Ngaire Anderson and Claire MacDonald.

00:27:29:05 – 27:45:00

Ngaire Anderson

So this section we're going to talk about the antenatal management of fetal growth restriction well, once it's been diagnosed. So I want to remind you, there's a table in the guideline that gives you the definition for diagnosis of both early-onset and late-onset fetal growth restriction.

00:27:45:04 – 00:29:50:16

Claire MacDonald

In this section of the guideline, we wanted to make it as user friendly as possible. So we've divided it into sections, a little bit of who does what. There's a section for the primary maternity care provider, usually a midwife and a section for the actions of the secondary maternity services. During a woman or person's pregnancy, we're screening for small for gestational age and fetal growth restriction throughout the pregnancy, particularly the third trimester. For any SGA baby, and that's a baby under the 10th centile mark centile customised estimated fetal weight or abdominal circumference under the 10th centile, it is a recommendation for referral to an obstetrician. And as we're considering that referral, we're also thinking what's going on? I'm going to read from the guideline at this point to be very clear.

- So confirming gestational age is important obviously
- Considering risk factors for placental-mediated fetal growth restriction, including risk factors that may have developed during the pregnancy since that first health assessment
- Review antenatal screening for aneuploidy or any other conditions that might have come from MSS1, MSS2 or non-invasive prenatal screening if that was performed
- Review the ultrasound for fetal biometry and consider if the Dopplers are normal or abnormal
- In review the ultrasound for the fetal anatomy scan just to see about the placental location and any unusual fetal morphology.

If any of those things are found to be outside the normal range, then that should be included on a referral into obstetric services. In some circumstances, the guideline recommends referring or having a discussion with fetal medicine services, and this is where there's a consideration of non-placental causes as potentially being the reason for fetal growth restriction. So those babies are the ones where there is fetal growth restriction before 28 weeks of pregnancy or fetal growth restriction with associated polyhydramnios or fetal malformation regardless of gestational age.

00:29:52:16 – 00:32:33:02

Ngaire Anderson

So early-onset fetal growth restriction is uncommon. It affects between half and 1% of all births and about 5 to 10% of all SGA pregnancies. But there is a higher chance of non-placental causes, which is the reason for the considerations as Claire has mentioned. Once we have excluded a non-placental cause and we've got an accurate due date, the overarching aim for management of an early-onset FGR is to prolong gestation as long as it's safe. So we are monitoring for fetal or maternal deterioration that might indicate birth is necessary, but aiming to prolong the pregnancy as long as is possible. If the fetus is SGA but there's no evidence of fetal growth restriction at this stage, surveillance includes growth scanning every two weeks. This should also include an assessment of maternal health, looking for the onset of maternal hypertension.

If the baby is growth restricted and fulfills the criteria for FGR as per the table, then monitoring should be at least weekly, and that includes an assessment of fetal wellbeing including a computerised CTG, fetal Dopplers (in particular umbilical artery Doppler) and fortnightly growth scans as above. And finally, if in the rare situation where you get absent or reversed end-diastolic flow in the umbilical artery Doppler, this is a baby that is particularly very sick and requires admission for birth planning.

I wanted to talk about computerised CTG in the context of early-onset fetal growth restriction. So the computerised CTG is a monitor where there is an electronic assessment of short term variability on the actual recording. So a computerised CTG is different to an electronic CTG, which is purely a digital trace of a regular CTG. So computerised CTG is recommended for use in early-onset fetal growth restriction because it improves inter-observer reliability and it provides the ability to assess short-term variability. Computerised CTGs are not available in all units and so in the absence of one, we'd recommend doing a regular CTG and Doppler assessments to assess the fetus. And finally, once the gestation gets to 32 weeks, the management of fetal growth restriction should flip over into the late fetal growth restriction pathway, which we'll be talking about next.

00:32:34:00 – 00:33:21:03

Claire MacDonald

Within midwifery and obstetrics, it's much more common to come across late-onset fetal growth restriction than it is early-onset, and that's the reason that we recommend screening right through the pregnancy until birth. When we think that there might be SGA or FGR and that's been found on ultrasound scan, then we're going to have a conversation with the whānau about what it is that we're looking at and what might be happening during the pregnancy. Has anything changed since the booking visit? Is there anything that we need to review and document in a referral and then recommend referral through to an obstetrician? We as midwives work collaboratively with obstetricians on an ongoing basis when there's been a reason for consultation with an obstetrician.

00:33:21:06 – 00:35:06:23

Ngairie Anderson

When late-onset SGA or fetal growth restriction is suspected and we've reviewed the due date, so we've got an accurate EDD, we've excluded non-placental causes of fetal growth restriction, our overarching management is then the optimum timing of birth. If the fetus is SGA but doesn't have any evidence of fetal growth restriction at this point in time, the recommended management is a fetal growth scan with fetal Dopplers every two weeks alongside clinical review, including a review of the maternal situation and a CTG.

If the fetus is growth restricted and fulfills the criteria for FGR as per our table, then the risk of deterioration is increased and it can happen a little bit more suddenly, so we do recommend that we do fetal Dopplers twice a week, clinical review and CTG twice a week, and also continue with those fortnightly growth scans until birth. In the rare situation where you have absent or reversed end diastolic flow in the umbilical artery Doppler, that baby is at particular risk and needs urgent admission for birth planning.

This guideline has some recommendations about timing of birth. In early-onset fetal growth restriction, planned early birth is reserved for those babies that are imminent risk of fetal deterioration and acidosis. For this reason, pre-labour caesarean section is recommended. Birth for late-onset fetal growth restriction is recommended by 38 weeks. Birth should not usually be before 37 weeks and induction of labour is recommended. For those babies that are SGA and not FGR then birth at 40 weeks is recommended.

00:35:07:11 – 00:35:45:20

Claire MacDonald

For anyone who's in labour with fetal growth restricted or small for gestational age baby, continuous monitoring with a CTG is recommended. That's really clear for babies with fetal growth restriction and for babies who are small for gestational age, particularly if the woman is in spontaneous labour, the guidelines still recommend continuous monitoring, but we do acknowledge that there's not a strong level of evidence for that. So, as with all of these decisions, the important thing is that a discussion is had between the midwife or the midwife and the obstetrician with the woman or person who is having the baby about monitoring during labour.

00:35:46:17 – 00:36:34:01

Ngairé Anderson

And a final note on the method of induction of labour. Balloon induction of labour or mechanical methods allow for cervical priming in the absence of contractions. Every time a uterus contracts, there is slightly reduced uterine and placental perfusion, which potentially has an impact on the reserve of the growth restricted fetus. So we have recommended mechanical methods, but we are also aware that misoprostol is becoming much more available as a method for induction of labour in Aotearoa. Studies that have compared misoprostol with mechanical methods of induction of labour have shown similar outcomes, including similar rates of caesarean section. However, there hasn't been specific data produced on growth restricted fetuses, so this needs to be interpreted with caution.

00:36:36:15 – 00:36:42:23

Anna Francis

In the section all about caring for the mother and the growth restricted baby, you'll be hearing from Chris McKinlay and Claire MacDonald.

00:36:53:20 – 00:37:18:08

Chris McKinlay

We're now going to talk in more detail about the screening and management of babies who have fetal growth restriction. It's important that we screen all babies for FGR 'cause only 60 to 70% of cases are picked up antenatally and it's important that we identify these

cases for future pregnancy planning and also for the care of infants and their future health. And Claire is going to talk about the screening process.

00:37:18:21 - 00:40:05:15

Claire MacDonald

Neonatal assessment is an integral part of midwifery practice in the hours following a birth. And for that we have made some recommendations in this guideline, particularly with reference to assessing for small for gestational age and fetal growth restriction. So the first two occur before even touching a baby and they are really worth doing while the woman is breastfeeding her baby and baby is skin to skin. So that's reviewing the fetal growth monitoring: were there any indications that the fetal growth may not have been what you would expect during pregnancy? Was there any indication of SGA or fetal growth restriction? And secondly, are there any risk factors for fetal growth restriction? Once it's appropriate to weigh the baby and you have that baby's weight, then it's really important that the weight is entered into the customised birth weight centile calculator, in order to get a customised centile for that baby.

Once you have the customised birth weight centile, the guideline provides recommendations on next steps depending on what that centile is. If the baby comes out at less than the third centile customised, then that is an indication of fetal growth restriction and a referral for paediatric review is recommended. For SGA babies who are less than the 10th centile but more than the third centile, this is when we need some additional information in order to diagnose fetal growth restriction. One of those is a length and that needs to be measured accurately and then entered into the calculator that we're making available to determine how normal or abnormal that is. So for those babies from the third to the 10th centile or less than the 10th centile, we need two additional factors out of the following list.

- One is a BMI z-score of less than -1.3, a length z-score of less than -1.3, skin or body fat z-score of less than -1.3 if that is measured
- Antenatal FGR diagnosis
- A major risk factor for FGR or
- Placental insufficiency through the antenatal Doppler scanning that you might have had done.

So if there are two of those present, then that's a diagnosis of fetal growth restriction for those babies in that third to the less than 10th centile zone and we're going to go into those more in a moment so that they can be a bit demystified. And finally, if the baby is over the 10th centile and we haven't had any concerns about fetal growth restriction, then those babies are in the normal zone: carry on with normal neonatal care. But I'll hand over to Chris to tell us all about z-scores and the other measurements of newborns who might have fetal growth restriction.

Chris McKinlay

Thanks, Claire. I just want to explain the rationale for including body mass index, BMI. So one of the key physical features of growth restriction as opposed to a small but healthy baby who has more than average constraint, is disproportion between the weight and length and BMI is one of the measures that we can use to detect that. It's easy because it comes out of the calculator, but it gives us another additional measure to see whether that baby has abnormal, pathological growth.

We are using z-scores at birth for the baby rather than the centiles which are used antenatally for several reasons. The first is we would like to be able to customise length and other growth measures for the babies, but currently the data aren't available, so we have to rely on large population databases as a reference. When we are assessing babies with abnormal growth, the most sensitive way that we can detect that on a population chart is to use a z-score. Now, a z-score tells you how far away a measure is from the normal or the average. And the advantage with the z-score is it's quite sensitive to abnormal measures and we're focusing on babies who are small. So just as an example, if you drop 40 percentage or centile points around the mean, that usually represents a z-score change of one or minus one. Whereas at the extreme (where it's already abnormal to be that small), if you're under the 10th centile and you drop four percentage points, that also represents a z-score change of one. That just gives you an example of how the z-score is much more sensitive at the lower end. They're also more accurate across a range of gestations whereas centile charts have to average growth over gestational ages. It is easy; it just comes out of the calculator and you can follow the flow chart with the number that you get from that.

The other thing I wanted to address is the reference in the guideline to skin or body fat. So the reason that babies with growth restriction have a lower weight for their length is partly because their bones are lighter and their organs are lighter, but they also have lower adipose or fat tissue and that's mostly in the skin. So some hospitals currently have things like peapods that can be used for measuring babies, and that certainly is done overseas routinely, and some practitioners will have the experience to measure a skin fold. And for a baby that's in that intermediate group between the third and the 10th, documenting or showing that skin fat is low or abnormally low can be quite helpful in making a distinction between FGR and SGA, but that again is an option that we put in the guideline. It's not something that everybody needs to do, but measuring the length accurately and getting the BMI can be really helpful for all babies that are under the 10th centile.

I'm just going to demonstrate now how to measure a length accurately in a baby. We've talked about how the definition of fetal growth restriction involves identifying disproportion between weight and length. To do that, we need an accurate length. If we just use a tape measure stretched, that can be out by one or two centimetres and when we're converting that to z-scores it can make a big inaccuracy in the measurement.

So to measure length accurately, you need a measuring board or a neonatometer: just a simple plastic board such as this one is perfectly sufficient. The first thing to do is to move the baby's head up to the end arm of the board, and then you need to bring the knees together and push them down flat and also bring the feet up to 90 degrees, then slide the bottom board up so that it touches the heels and the toes are pointing straight up and ensuring that the head is in a neutral position and touching the top board. And then you can read off the number from the board at the base.

00:44:19:14 – 00:45:33:22

Claire MacDonald

Coming back to that concept of the right care for the right people at the right time: what we've tried to do in this guideline is be a lot more specific about which babies actually do need additional care and monitoring after birth. And what we've just done is describe fetal growth restriction and how to diagnose that. So if you've made a diagnosis of fetal growth restriction, then that fits into our new referral guidelines as a criteria for referral to a specialist.

That being said, if you haven't diagnosed FGR and that will be some babies that might previously have been referred, those third to less than the 10th centile babies that don't actually have any other factors indicating FGR, that's no longer a criteria for consultation. And so those babies can broadly be normalised. When babies are recommended to be referred for consultation that also triggers the recommendation for the use of the NOC/NEWS chart for monitoring those babies a little bit more closely and monitoring for hypoglycemia. So I'll hand over to Chris about what the specialist services do once they receive a referral for fetal growth restriction.

00:45:34:12 – 00:48:03:10

Chris McKinlay

So for the paediatric or neonatal teams assessing the baby after referral, firstly, it's important to confirm the diagnostic criteria. You can use the flowchart to work through that. But the key thing once a baby has been diagnosed with FGR is to think about the cause. In most cases, this is going to be due to placental insufficiency, but we want to see evidence of that, and that can include abnormal Doppler studies and potentially, down the track, histopathology.

If the Doppler or the histopathology confirms that there is placental insufficiency and there are no other concerning features on the examination of the baby, then nothing further needs to be done. If, however, there's no evidence of placental insufficiency, then we need

to think a little bit harder about the causes and the first line recommendations are to do a full blood count, looking for cytopenias and then a urine CMV and to ensure that the hearing screen has been done. In cases such as congenital CMV will be picked up by these three screening processes.

The reason that I mentioned the histopathology, although that's not going to help on day one, it is important for getting the most accurate and clearest diagnosis possible. And there will be a group of babies where the FGR is suspected but will be confirmed on histopathology. And that's important both for our data collection, but also for that baby's mother for planning for future pregnancies.

It is recommended in the guideline that, in all cases of FGR, placental histology is sent. We realise that that's not possible in all places in New Zealand at the moment. The priority cases are those with severe growth restriction so less than the third customised birthweight centile or early growth restriction. And we recognise that particularly in rural parts of New Zealand, it's there are there are challenges and it's important to talk to the woman / person and whānau about how a placenta can be transported safely and to talk about the return of that tissue and also to be to be clear about whether any tissue will be retained and to get their permission for that.

00:48:04:04 – 00:48:37:15

Claire MacDonald

That brings us to the end of the clinical content of these webinars. We now encourage you to go and have a look at the guideline. There are two documents for you to have a look at: the evidence summaries which provide the detailed background and the evidence that underpins the recommendations and then the summary document of the recommendations, which includes the tables and the flowcharts and those are printable and hopefully easily easy to follow.

So we'd like to thank you for joining us. We look forward to hearing how the implementation is going to go in your area.

00:48:38:22 – 00:48:54:12

Anna Francis

Thanks for listening. And I just want to add from a family perspective just how important it is for information sharing and working from the ethical frameworks, because then we feel really reassured that all that can be done is being done even at a time that might be really scary.

00:49:03:09 – 00:50:33:24

Ngaire Anderson

Thank you for viewing these videos on the *SGA and FGR Guideline for Aotearoa*. Note to mention that these videos were intended as a summary of the guidelines and a lot more detail can be found in the guideline documents themselves, including tables and flowcharts that are useful for clinical practice. So please go to the Te Whatu Ora website and have a read.

So the development of a national evidence-based small for gestational age guideline was funded by ACC as part of the Neonatal Encephalopathy Taskforce to reduce preventable neonatal encephalopathy cases. It underpins the GAP programme for detection of SGA pregnancies.

The multidisciplinary group involved stakeholder representatives from across the maternity sector and consumer representation. The guideline recommends international best practice, and international literature has been interpreted within the context of New Zealand Aotearoa's model of maternity care. Recommendations are based on a systematic review of international evidence and where evidence is not certain, this is noted and recommendations are based on expert consensus opinion.

I'd like to take the opportunity to thank the people that were involved with the development of this guideline. First of all, ACC for helping to fund this guideline development. To the Panel members themselves who put in an enormous amount of effort. To all the people that provided feedback on the guideline in order to make it better and to the colleges for their endorsement.

00:50:34:13 – 00:50:45:02

Anna Francis

And I'd like to thank you for taking the time to watch this and implementing this work because the service that you provide families under these guidelines are saving lives. So thank you so much.

00:50:45:21 – 00:51:26:14

Ngaire Anderson

We can only improve outcomes for our mothers and babies if we detect and manage fetal growth restriction consistently. The aim of this guideline is to standardise care across Aotearoa, so regardless of where you live, you have the same access to care and the

same outcomes. We can only do this if we are aware of the guideline and implement it consistently.

I encourage you to read the guideline. In particular, pay attention to the summary document, take advantage of the flowcharts and the tables that are there to make application of these a lot more easy. Talk to your colleagues, talk to your GAP educators and implement these guidelines consistently and hopefully we will make pregnancy safer for all.